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Cross Section Analysis Missouri River Rulo, Nebraska to Mouth At St. Louis, Missouri April 1987

Volume I

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MISSOURI RIVER
CROSS SECTIONAL DATA EVALUATION
FOR VARIOUS RIVER REACHES

SECTION I - INTRODUCTION

Since the early nineteen hundreds, the Corps of Engineers has employed a monitoring program to observe, document, and investigate the changes and impacts associated with the changes taking place on one of our major waterways. For over the last half century, the Missouri River has been transformed from a wild, carefree, and unpredictable natural river into a modified and semi-regulated river capable of better serving the communities in the basin and thereby benefiting the overall national economy of the United States. Because of the regulated river flow, controlled discharges by the several upstream dams, constrained river banks by the many levees, and the channelization and bank stabilization structures, the river flow regime has changed significantly from its original regimes.

This report is a part of the continuous efforts of the Missouri River Division to identify the effect of changes on river hydraulic characteristics in the downstream portion of the Missouri River from Rulo, Nebraska to the mouth near St. Louis, Missouri. These efforts primarily include the impact on navigation in the river and secondarily on the hydraulic efficiency of the channel. This report investigates the

cross sectional parameter changes using hydrographic survey data from 1941 through 1983 for various years at six 10-mile reaches, as shown on Figure 1. The cross sectional parameters analyzed include the cross sectional area, top width, average flow depth, average bottom elevation, thalweg location and elevation, and the coordinates of the cross section centroid. Computer programs have been developed for this investigation to verify compiled data, correct data errors, and compute the composite parameter values. The historical bankline migration from 1941 to 1980 for the six reaches are shown on Figures 2 through 7.

The main objective of this investigation was to compare various channel characteristics over time. To achieve this objective, several other goals were necessary. They are as follows:

- 1) Develop a computer program for compiling, analyzing and displaying data on river characteristics;
- 2) Develop a data base for future studies;
- 3) Compare six 10-mile reaches on the Missouri River from 1941 to 1983;
- 4) Detect trends, if any, in the characteristics;
- 5) Find explanations for trend variations, if variations are observed;
- 6) Visually illustrate the channel characteristic variations;

7) Determine if there are differences between the same characteristics of river bends versus crossings, high water levels versus low water levels, and full cross sections versus partial cross sections; and

8) Provide a computer program or programs flexible enough to complete the above objectives and be used in future investigations of this type.